Providing Comprehensive and Efficient Solutions for Implementing Fuzzy Logic Controls in a Wide Range of Industries

**MSI**

Menta logic
SYSTEMS INC.

"Fuzzy Technology in Real Systems"

OUR PROFILE

Established in 1991, we specialize in the design and production of development tools and advanced control systems using fuzzy logic, neural networks and other intelligent technologies.

We provide complete support for our products and systems.

We expand our capabilities through joint ventures and licensing of third-party companies.
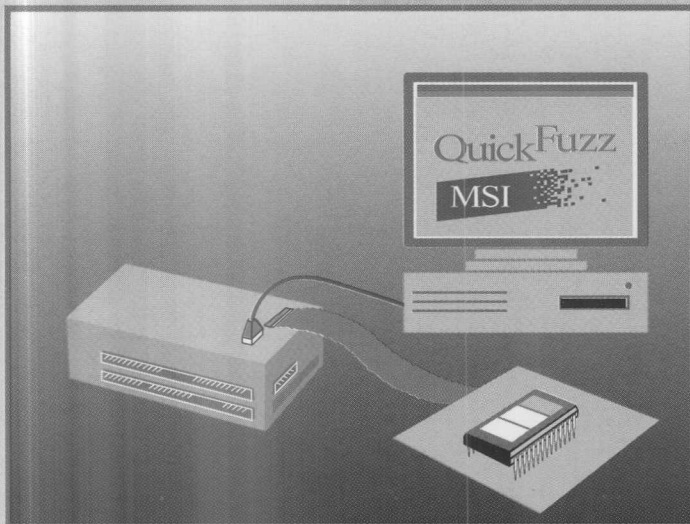
Providing Complete Services and Products for Implementing Fuzzy Logic Control Systems.

OUR PRODUCTS

All our products come with user friendly software in a PC Windows 3.1 environment and proper hardware support to design, customize and validate industrial control systems. We develop products for three industrial control segments:

Embedded Control Products

QuickFuzz - A low cost development station suited for producing customized microcontrollers for embedded fuzzy control applications in a single microcontroller chip.

AutoFuzz - A comprehensive and fully automated development station for multi-loop fuzzy control systems that provides auto-tuning and auto knowledge base generation as well as automated development of the non-fuzzy tasks using an object oriented operating system (runs on Intel X251, X196 and X386EX families).

FMC (Fuzzy Microcontroller Chips) - 8 bit microcontrollers programmed with MSI's fuzzy inference engine for fuzzy control product development.

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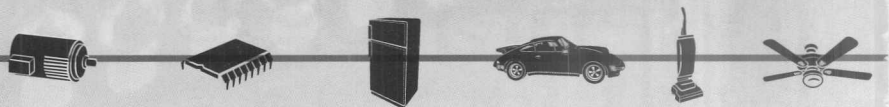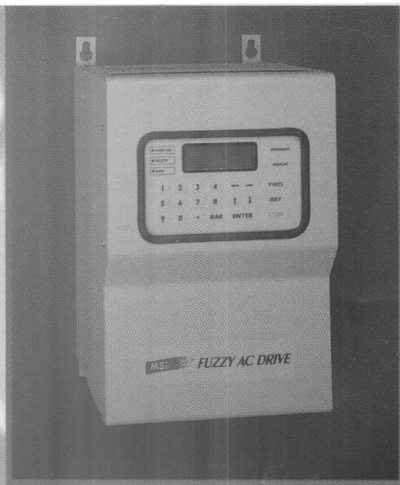
Fuzzy Controlled AC/DC Drives

The MSI Mechatronics Division offers a wide range of variable speed AC and DC motor drives with embedded fuzzy logic control systems ranging from low cost to very high precision motion control.

FD - A (Fuzzy Drive for AC Motors) - A family of energy efficient AC drives that employs fuzzy logic as an energy manager as well as a built-in Fuzzy-PLC system to customize the drive applications.

MultiFuzz-Drive - A Windows based system which provides tools for the customization of the AC/DC drives, fuzzy and PLC controls.

Distributed Control Systems

Fuzz-PLC 104 - A distributed fuzzy-PLC control system built with a PC-104 bus multiple processor system.

MultiFuzz - A design package tailored for plant and process automation. This system provides tools to develop distributed Fuzzy-PLC control, coordinated intelligent management of multiple loops and a group control and process manager. This system supports the MSI Fuzz-PLC 104 and other vendor systems such as Ziatech 32 and PROLOG STD-80.

SimFuzz - A software package offering powerful simulation and modeling of complex and non-linear dynamical systems. This package allows the process control to be developed off-line so that the simulated fuzzy control system performs as required on the first attempt.

OUR APPLICATIONS

Embedded Control - Applications include consumer electronics, appliances, or any low cost single chip control solution.

Industrial Drives and Process Control - Applications include variable speed AC or DC drives, energy efficient applications in HVAC blowers, motion control and intelligent appliances, process industrial control and line control.

Distributed Process Control - Applications include plant automation, industrial process control with facilities for overall system balancing requirements and optimization.
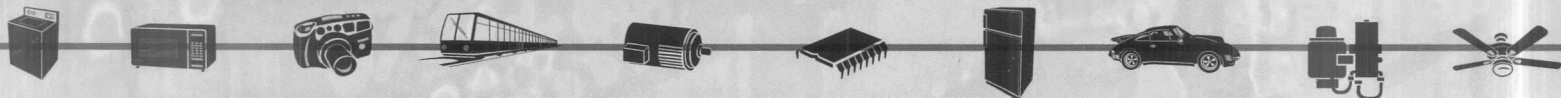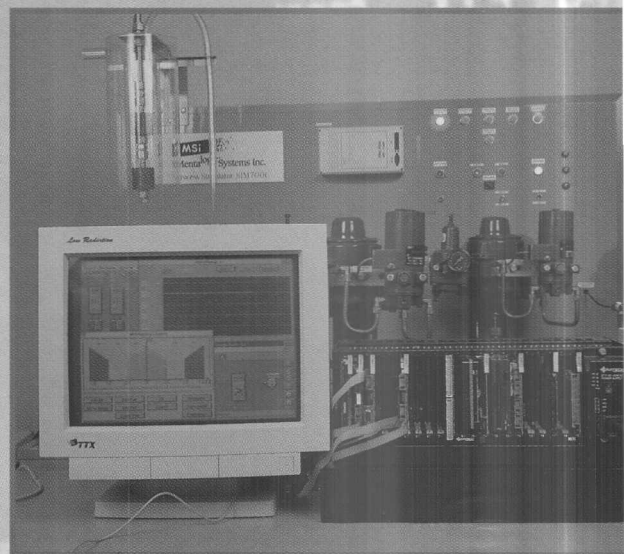
OUR COMPETITIVE ADVANTAGE

Real-time Fuzzy Control - our proprietary fuzzy logic technology is faster than conventional fuzzy logic techniques, thus enabling REAL TIME applications.

Low Cost - our control uses a fraction of the CPU time and memory, thus enabling sophisticated control on LESS EXPENSIVE chips.

Auto-Tuning and Knowledge Base Generation - our development tools automatically generate and optimize the knowledge base, membership functions and rules, thus OPTIMIZING CONTROL PERFORMANCE and minimizing the development time.

Automated Development - our tools automate the fuzzy and non-fuzzy control tasks of the application using virtual device drivers which run on an object oriented operating system on the microchip, thus dramatically decreasing the TIME TO MARKET.

User Friendly - our systems provide an intelligent engineering interface that allows rapid design of state-of-the-art fuzzy control systems.

OUR SERVICES

Our team of in-house scientists and engineers can implement all aspects of the application development. Using our automated development tools, we can rapidly complete most projects in a fraction of the time normally required.

We also provide complete technical support and training for our development tools.

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FUZZY LOGIC CONTROLLED VARIABLE SPEED AC DRIVES
The FD-A Family of AC Drives

The MSI Mechatronics Division introduces to the market its FD-A family of fuzzy logic controlled variable speed AC motor drives. The FD-A family is the first representative of the next generation of AC general purpose energy efficient drives designed for wide variety of industrial applications.

Drive Features:
- Up to 10 HP
- 3 phase AC 575V, 50/60Hz
- Wide range of programmable features
- RS232 and RS485 serial communication
- 4 line by 20 character LCD display and keypad
- An Intelligent Fuzzy Control Energy Manager which performs dynamic evaluation of the motor's load to optimize energy consumption
- Process history data generation
- Standard diagnostic display
- Standard protection features
- And many more features (See FD-A drive brochure)

Customer Support:
Our Mechatronics application engineers can work with you to provide on-line help free of charge. 1 year full maintenance and service is provided with each drive unit at no extra cost.

Special Entry Price

Please contact me, I wish to:

☐ Purchase an FD-A drive for my fuzzy control application.

☐ Work jointly with MSI to develop my fuzzy control application.

☐ Contract MSI to develop my fuzzy control application.

☐ Attend seminars.

Special Entry Price Of $2,700 Can.*

Please fax this page to MSI at (905) 940-0321

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Position: _____
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_____ City: _____
Prov./State: _____ Postal Code: _____
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145 Renfrew Drive, Unit 210
Markham
Ontario, Canada
L3R 9R6
Tel: 905 940-6756
Fax: 905 940-0321

*Offer valid until July 1st 1995 for a limited quantity of drive units.

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Drive Features:

- Up to 10 HP
- 3 phase AC 575V, 50/60Hz
- Wide range of programmable features
- RS232 and RS485 serial communication
- 4 line by 20 character LCD display and keypad
- An intelligent Fuzzy Control Energy Manager which performs dynamic evaluation of the motor's load to optimize energy consumption
- Process history data generation
- Standard diagnostic display
- Standard protection features
- And many more features (See FD-A drive brochure)

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Fax 905 940-0321

Offer valid until July 1st 1995 for a limited quantity of drive units.

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SimFuzz
Automated Fuzzy Simulator Software

Windows-based software:

SimFuzz is a powerful simulator with the ability to model highly complex nonlinear systems. It also allows you to simulate the application of fuzzy logic control systems. *SimFuzz* enables you to explore the effects of fuzzy rules with changes to the membership functions and to investigate the various applications of fuzzy logic to the control of dynamical systems. The tools are graphical, easy to use and lead you step-by-step to the design of fuzzy control applications.

SimFuzz allows you to:

- Study the behavior of fuzzy control systems
- Design fuzzy control systems
- Simulate complex dynamical systems with a high degree of accuracy
- Learn fuzzy logic in a complete software based environment

SimFuzz features:

- The simulator has 46 extremely powerful blocks.
- New simulation algorithms which are faster and more powerful than the classical Runge-Kutta 4 and Euler methods.
- Simulates highly nonlinear differential equations.
- Unmatched capability of simulating equations of highly stiff systems.
- User friendly graphical interface with colorful icons and windows.
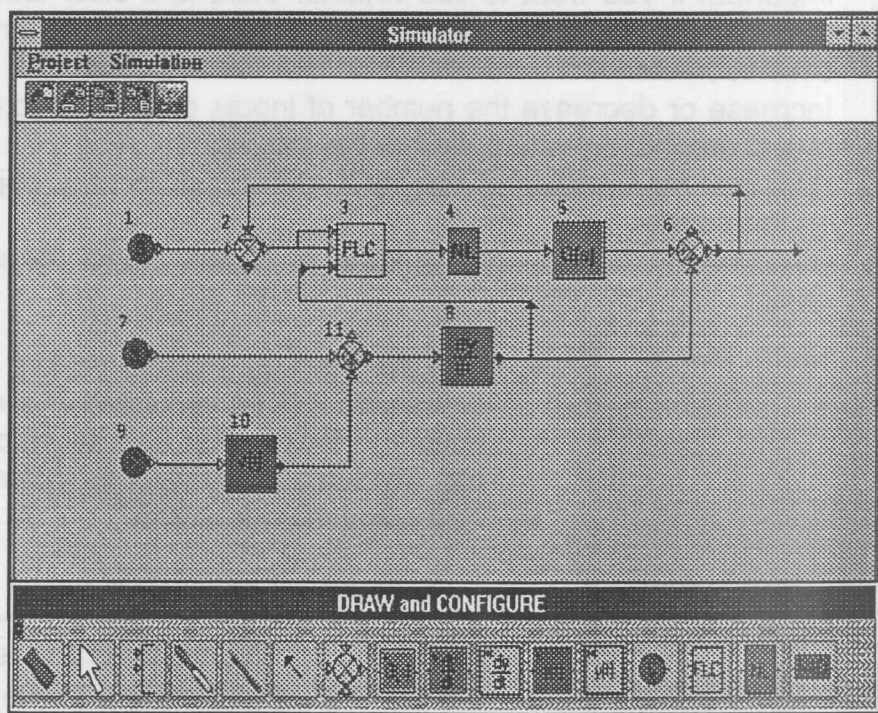
SimFuzz: The Workspace

More features:

- Simulates all combinations and types of systems. (For example: transfer function blocks, differential equation blocks etc.)
- Completely object oriented design and implementation using C^{++}.
- All equations are entered in the same format as you would write them on a piece of paper.
- Connectivity between the objects is achieved automatically by drawing a line between the objects. (No need to declare the input or output relationships of the object).

Process Icons
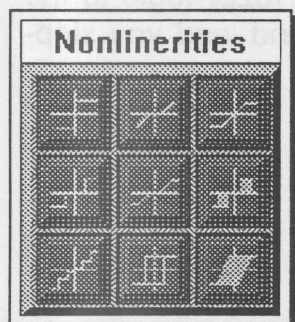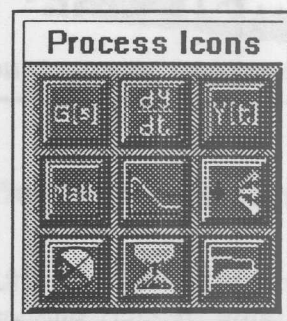
- The connecting lines automatically move with the object as the object is dragged along the screen.
- Disconnecting the lines removes the relationship between the objects.
- Very versatile dynamical plot facilities. Allow you to stop the simulation at any moment in time, perform some changes and resume the simulation from where it was left.
- Create many plots on the screen.

Nonlinerities

- Continue simulation for another repeat of the number of samples or simulation time. This feature is particularly important if you want to see whether there is a slow drift in the system response, or whether there is a sustained oscillation etc.
- Increase or decrease the number of inputs or outputs to the object graphically with a click of the mouse.
- Reverse the direction of the input and output for any object on the screen.
- Reverse the polarity of the input or output signal for any object.

Signal Icons
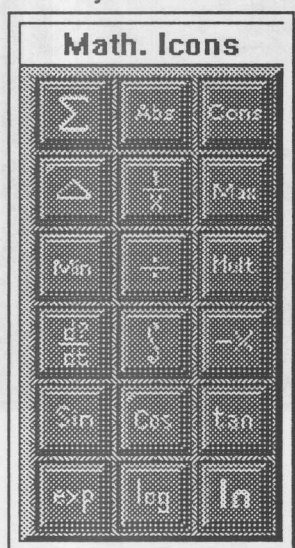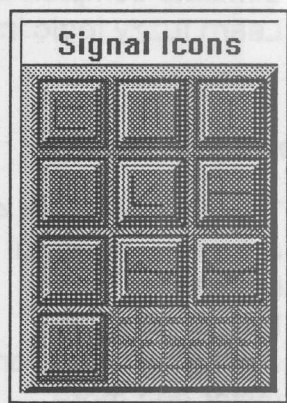
- Use the powerful formula editors to configure your system or construct your simulated system using simple discrete building blocks such as integrators, summers, multipliers, etc. which are also available in the form of icons.
- And many more features.

Math. Icons

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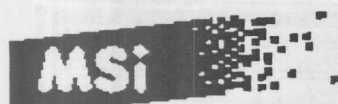
MENTALOGIC SYSTEMS INC.

QuickFuzz Fuzzy Microcontroller Development Station

Windows-based software:

MSI's *QuickFuzz* is a Windows-based development station for developing embedded fuzzy control applications to run on popular low-cost microcontrollers. The microcontrollers are programmed with the MSI advanced fuzzy inference engine which runs fuzzy logic controllers in real time operation.

Low memory requirements:

Instead of working with 16 or 32 bit microcontrollers, MSI's fuzzy logic inference engine can deliver the same performance on 8 bit microcontrollers.
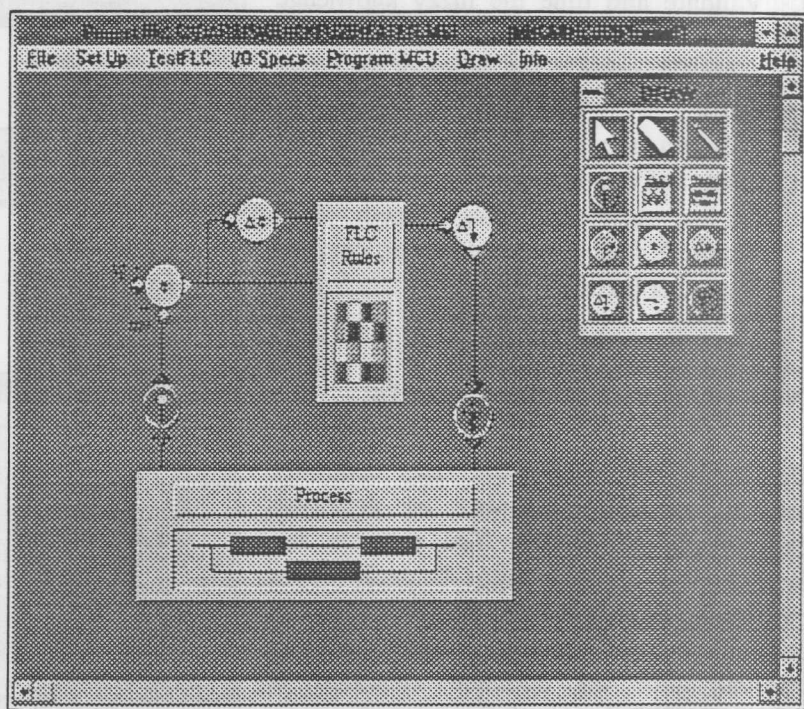
The Workspace And The Control Diagram

Less development time:

QuickFuzz covers all the design phases of these advanced fuzzy controllers. The cost of development to meet your real-time and high performance requirement is significantly reduced. *QuickFuzz* supports embedded control applications: home appliances, AC/DC motor drivers (up to 2 HP), variable speed and positioning control, environmental devices, air-conditioning units and many other embedded applications.

QuickFuzz consists of the following systems:

- *QuickFuzz* Shell for knowledge base (fuzzy rules and membership functions) generation and tuning.
- *FlexFuzz:* A highly intelligent universal fuzzy controller (Includes analog I/O, PWM, frequency inputs and signal conditioning).
- Fuzzy Evaluation Board for a particular microcontroller and an Adapter Board for interface with microcontroller emulation tools.

QuickFuzz enables you to:

- Use *FlexFuzz* as a stand-alone fuzzy controller that allows you to continuously monitor the response of the system;
- Develop real-time fuzzy applications;
- Validate and tune the fuzzy knowledge base on the *FlexFuzz* universal controller prior to the design of the target board;
- Program the microcontroller with the fuzzy and non fuzzy user code; and
- On-line test the programmed (final product) fuzzy microcontroller chip on the target board.
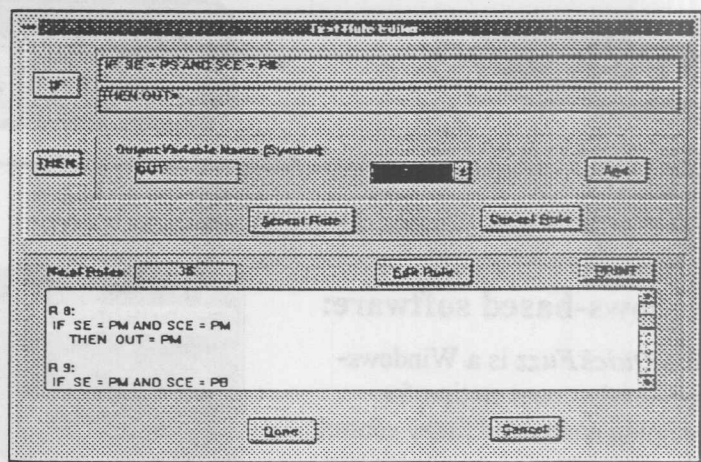
Fuzzy Rule Editor

No prototype requirements:

Developing and testing the fuzzy controller for an application requires no prototype experimentation phases. You can run the fuzzy controller and monitor the performance by plotting the response of the system for any combination of set-point and sampling interval until an optimum condition is achieved. The design of the target board is not required until the final fuzzy knowledge base is generated and the final testing is approved.
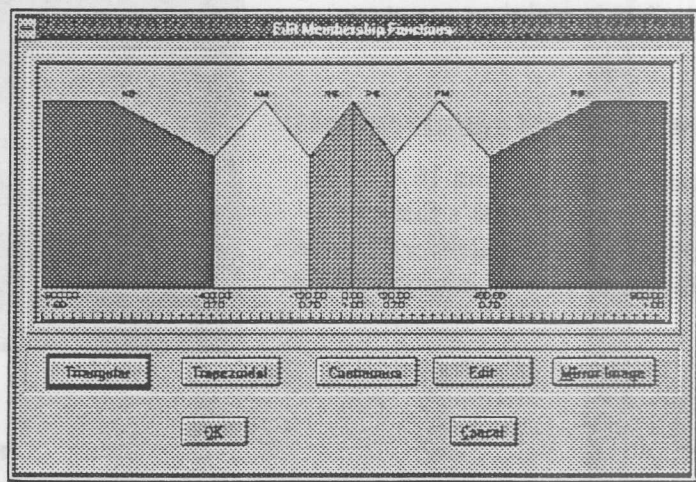
Membership Function Editor

Full technical support:

MSI offers a full support package including training, on-line help, application notes, and subcontracting the embedded fuzzy controller development.

Library of microcontrollers

MSI presently accommodates fuzzy evaluation and adapter boards for the Motorola MC68HC11 and MC68HC05 microcontrollers. Additional evaluation and adapter boards can be developed on demand to accommodate microcontrollers of other major vendors.

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QuickFuzz
Fuzzy Microcontroller Development Station & MSI Support To Develop Applications

QuickFuzz is a complete set of tools for developing fuzzy control applications using popular microcontrollers. This system is designed to develop low cost but advanced fuzzy controllers for the embedded control industry (device and equipment control).

QuickFuzz enables you to:
1) validate and tune the fuzzy knowledge-base prior to the design of the target board;
2) develop real-time fuzzy applications;
3) program the microcontroller with the fuzzy and non-fuzzy codes;
4) provide on-line testing of the programmed fuzzy microcontroller on the target board;
5) produce the final programmed microcontroller chip for your system.

QuickFuzz comes with:
- The *QuickFuzz* Windows-based Shell for fuzzy knowledge-base generation and validation.
- *Flex Fuzz* Universal Fuzzy Controller with analog I/O, PWM, frequency inputs and signal conditioning to interface to your process prior to the design of your target board.
- A Fuzzy Microcontroller Evaluation Board for 8 bit microcontrollers.

Fuzzy logic is the tool to design the next generation of low cost and advanced control systems.

MSI can help you to develop efficient and reliable fuzzy systems:
- We supply you with the *QuickFuzz* system, application notes, training and support.
- We supply the required quantity of the mass product version of the programmed single microcontroller chip which is programmed with your application code and the MSI real-time fuzzy engine.
- We can work jointly with you to develop the fuzzy controller for your system within our customer support program.
- We can develop the fuzzy controller for your system with low cost and minimum development time within our contract program.

Our scientists and engineers can work with you to meet your particular requirement to develop a cost-effective fuzzy control solution for your company.

For Further Information Please Contact
The Application Development Department
MENTALOGIC SYSTEMS INC.
145 RENFREW DR., UNIT 210, MARKHAM, ON L3R 9R6 CANADA
TEL. 905 940 6756 FAX. 905 940 0321

Please contact me, I wish to:

☐ Purchase *QuickFuzz* to develop my fuzzy control application.

☐ Work jointly with MSI to develop my fuzzy control application.

☐ Contract MSI to develop my fuzzy control application.

☐ Make arrangements to visit MSI.

☐ Attend seminars.

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Position: _____

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Special Low
Price Of
$3495 Can.

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